

P02074US2A(P348)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of)	
)	Robert C. Boyle, Examiner
RADEMACHER et al)	
)	Art Unit: 1796
)	
Serial No. 10/560,099)	Confirmation No. 9529
)	
Filed January 29, 2007)	Atty Docket:
)	P02074US2A(P348)
)	
For HYSTERESIS ELASTOMERIC)	
COMPOSITIONS COMPRISING)	
POLYMERS TERMINATED WITH)	
ISOCYANATO ALKOXYSILANES)	

DECLARATION OF DR. TERRENCE E. HOGAN
37 C.F.R. § 1.132

Sir,

As an inventor in the subject application, I hereby declare that:

1. I am a resident of Uniontown, Ohio and am an inventor in the subject application.
2. My educational background includes a B.S. in Chemistry and Mathematics from Lewis University and a Ph.D. in Chemistry from The Pennsylvania State University.
3. I am a named inventor in at least 24 United States letters patents.

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4. I have been employed by Bridgestone Research, LLC, or its predecessor, for approximately 12 years and am presently the Section Manager of Polymer Synthesis, at their Akron, Ohio research facility.

5. I am aware of the prosecution history of the subject application and have read the recent Office Action dated October 1, 2009. I understand that the Examiner believes that the claimed invention is not patentable over Schreffler (U.S. Pat. No. 6,451,935) in view of Ozawa (WO 01/34658).

6. I disagree with this conclusion and believe that it fails to properly account for the level of skill in the art and what one of ordinary skill in the art would predict.

7. To begin with, the molecule used as a terminating agent in Schreffler is very different from the molecule used in the claimed invention. And, the differences between the molecules play a significant role in what would be predicted by one of ordinary skill in the art.

8. In particular, the molecules employed in practicing the claimed invention include both an isocyanate functionality and an alkoxy silane functionality. Schreffler does not contemplate complex isocyanate-containing molecules of this type.

9. Ozawa employs complex molecules similar to those now claimed to terminate polymers prepared with lanthanide-based catalysts. Ozawa, however, takes advantage of the differences between those polydienes prepared by lanthanide-based catalysts as opposed to those prepared by anionic polymerization. That is, alkoxy silane functionalities do not react with polymers prepared using lanthanide-based catalysts. As a result,

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Ozawa was able to ensure that the reaction between the polymer and the terminating agent would occur at the isocyanate functionality (to the extent that any reaction would occur).

10. But, when polymers are prepared by anionic polymerization, a much more complicated and unpredictable situation exists. This is because anionically-polymerized polydienes react with alkoxysilane functionalities. This reaction proceeds via a nucleophilic substitution reaction whereby the alkoxy functionality ($-OR$) leaves and the carbanion of the polymer bonds to the silicon atom of the parent alkoxysilane functionality.

11. When an isocyanate is also present (as it is in the claimed invention), there is a distinct possibility that the alkoxy functionality ($-OR$), which is a leaving group, would react with the isocyanate functionality to form a carbamate functionality (*i.e.*, a urethane linkage) and thereby frustrate the formation of the intended end-group functionality.

12. In sum, the teachings of Ozawa offer little guidance in practicing the present invention—or in predicting the outcome of the present invention—since Ozawa is exclusive to the termination of polymers prepared by lanthanide-based catalysts. Since alkoxysilanes do not react with polymers prepared by lanthanide-based catalysts, one skilled in the art could not predict whether a similar terminating agent could be used to terminate anionically-synthesized polymers.

13. I also understand that the Examiner believes that the term “anionically-polymerized polymer” does not adequately define the polymer that is used to react with the claimed terminating agent.

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14. I disagree with this conclusion. The term "anionically-polymerized polymer," while sounding in process language, defines a unique polymer structure that cannot be obtained by other polymerization techniques. For example, the microstructure resulting from the anionic polymerization of conjugated dienes is unique. In other words, inherent in the process of anionic polymerization is the production of a unique polymer product.

15. As those skilled in the art appreciate, by using a lanthanide-based catalyst, Ozawa obtained high-*cis* polydienes, which are generally characterized by a *cis* content in excess of 70 or 80% (more likely greater than 90%). The vinyl content of these polydienes is lower than 10% and generally in the range of 0-3%.

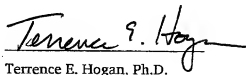
16. Polydienes, or copolymers of diene and vinyl aromatic monomer, prepared by anionic polymerization typically have a *cis* content below 50%. While these values can be manipulated within reasonable ranges, the ability to form high *cis* polydienes (e.g., > 70%) cannot be achieved with anionic polymerization techniques. Similarly, anionic polymerization of conjugated dienes cannot provide a polymer with a vinyl (i.e., 1,2) microstructure below about 8%. As a further point of distinction, those skilled in the art appreciate that copolymers of dienes and vinyl aromatics cannot be achieved by employing lanthanide-based catalysts.

I hereby declare that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United

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States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted,

A handwritten signature in cursive script, reading "Terrence E. Hogan", is written over a horizontal line.

Terrence E. Hogan, Ph.D.

Date: _____

1/4/2010